BLUE ROCK ENVIRONMENTAL, INC.

FILE COPY

Mr. Robert Stone
Hazardous Materials Specialist
Humboldt County Health Department
Division of Environmental Health
100 H Street, Suite 100
Eureka, California 95501

May 11, 2005

Re: Second Quarter 2005 Groundwater Monitoring Report
Former Cash Oil Arcata
421 J Street, Arcata, CA
HCDEH LOP No. 12302
Blue Rock Project No. NC-3

Dear Mr. Stone,

This report presents the results of the second quarter 2005 groundwater monitoring activities at 421 J Street, Arcata, Humboldt County, California (site) (Figure 1), and was prepared for Clyde Harvey by Blue Rock Environmental, Inc. (Blue Rock).

Background

Site Description

The former Cash Oil Arcata Service Station is located on the corner of J Street and Samoa Boulevard (State Highway 255) in Arcata, California. The site is located in an area of low topographic relief on the Arcata Bottoms as shown in Figure 1.

The site had one single-story building with two pump islands (removed in 1/04) that were used to dispense unleaded gasoline from two upgraded single walled steel 10,000-gallon underground storage tanks (USTs) and one 10,000-gallon fiberglass UST. The site is served by public utilities for drinking water and sewer disposal. Surrounding property use is a mixture of commercial, industrial, and residential. To the north, the site is bordered by Café Mocha and the Finnish Country Sauna and Hot Tubs. An apartment complex lies adjacent to the western property line. The site is bordered to the south by Samoa Boulevard. Properties on the south side of Samoa Boulevard are primarily industrial including an auto body shop and woodworking shops. J Street borders the eastern property line east. Figure 2 is a site plan showing major features of the site and its surroundings.

Site History

A gas station has occupied this site since approximately 1978. The Cash Oil Company began operating the station in 1989. In 1997, permission was granted by the Humboldt County Division of Environmental Health (HCDEH) to line the existing USTs. During the tank lining process, cathodic protection was installed to protect the single-walled steel tanks and piping. During tank upgrade activities, soil and groundwater samples were collected from two borings (B-1 and B-2) that determined a release of petroleum had occurred from the tank system. Results from this investigation are presented in Clearwater Group's *Initial Subsurface Investigation Workplan*, dated June 18, 1999.

In May 2000, Cash Oil Company sold the property and upgraded UST system to Golden Gate Petroleum of Martinez, California.

In January 2004, Beacom Construction (Beacom) of Fortuna, California, on behalf of Golden Gate Petroleum, removed the (3) 10,000-gallon USTs and associated fuel dispensers from the site.

On March 18, 2004, Beacom installed (2) new 10,000-gallon USTs at the site. During the installation of these USTs monitoring well MW-1 was destroyed.

Site Investigation and Corrective Action History

On December 2, 1999, Clearwater Group (Clearwater) observed Fisch Environmental drill six borings (B-3, B-6, B-7, B-8, B-9 and B-10) to collect soil and grab groundwater samples for laboratory analysis. Two additional borings (B-4 and B-5) were attempted, but encountered refusal at a depth of approximately 1.5 feet below ground surface (bgs). Soil sample results from the completed borings indicated that concentrations of total petroleum hydrocarbons as gasoline (TPHg) and methyl tertiary butyl ether (MTBE) in site soils are located primarily in the vicinity of the southerly pump island and southern margin of the UST excavation. Clearwater submitted results and recommendations in an *Initial Subsurface Investigation Report*, dated February 23, 2000, to the HCDEH. In a letter dated March 28, 2000, the HCDEH concurred with Clearwater's recommendations for further investigation.

On August 31, 2000, Clearwater installed four groundwater monitoring wells (MW-1 through MW-4) and one soil boring (B-11). Results of the investigation were presented in Clearwater's *Subsurface Investigation and First Quarterly Monitoring Report*, dated October 13, 2000. This phase of work included the initiation of quarterly groundwater monitoring.

Clearwater submitted an *Interim Remedial Action Workplan*, dated January 29, 2001, to the HCDEH. This workplan proposes and details the installation one onsite groundwater extraction trench and the installation of downgradient offsite monitoring wells. The HCDEH approved this workplan in a correspondence letter dated February 28, 2001.

On November 8, 2001, Clearwater supervised the installation of three additional monitoring wells south of the property: MW-5, MW-6 and MW-7 (Figure 2). These monitoring wells were

placed downgradient in off-site locations to further assess the sorbed and dissolved-phase hydrocarbon contamination associated with the UST release. Borings were advanced to 20 feet bgs and well construction consisted of a screened interval from 3 to 20 feet bgs. Results from this investigation defined the extent of sorbed and dissolved-phase hydrocarbon contaminants associated with the site. A sensitive receptor search completed within a 1,000-foot radius of the site indicated that there is (1) industrial water well, which is located 400 feet northwest and cross-gradient from the site. Results from this investigation are presented in Clearwater's *Additional Assessment and Fourth Quarter 2001 Groundwater Monitoring Report*, dated December 10, 2001.

Clearwater submitted a *Corrective Action Plan (CAP),* dated May 10, 2002 to the HCDEH. The *CAP* presented a summary of the hydrogeology and contamination. The report evaluated remedial alternatives and concluded that a combination of source soil removal, groundwater extraction from open excavation and enhanced bioremediation using oxygen releasing compounds (ORC) would be the best remedial alternative for the site. An enhanced bioremediation background study was proposed in the *CAP*. Preparation of a *CAP* was requested by the HCDEH in a letter dated March 13, 2002. The *CAP* was approved by the HCDEH in a correspondence letter dated May 21, 2002.

Clearwater submitted a *Remedial Action Plan (RAP),* dated February 14, 2003 to the HCDEH for review. The *RAP* evaluates results from natural attenuation pilot testing and details the excavation of contaminated soil, excavation dewatering activities and the use of enhanced bioremediation (ORC). These remedial activities were based on working in conjunction with future site renovation activities.

Clearwater submitted a *Report of Waste Discharge (ROWD),* dated May 30, 2003 to the North Coast Region Water Quality Control Board (NCRWQCB) for review. The *ROWD* details the subsurface placement of oxygen releasing compounds (ORC) and complies with waste discharge requirements. The NCRWQCB concurred with the *ROWD* in a letter dated January 5, 2004.

On December 24, 2003, there was an unauthorized release of petroleum hydrocarbons at the site near the dispenser island and monitoring well MW-1. A report of this release is on file at the HCDEH CUPA Department. The HCDEH responded to this release by issuing Golden Gate Petroleum a "Notice of Responsibility" letter dated February 19, 2004.

In January of 2004, Clearwater supervised Felt Mountain Construction of Corning, California excavate 2,332 tons of petroleum contaminated soil and pump approximately 13,000 gallons of contaminated groundwater from the vicinity of the former UST fuel system. The remedial soil excavation removed approximately 824 pounds of hydrocarbons from the site. Clearwater mixed approximately 1,020 pounds of ORC into the excavation backfill. Monitoring well MW-3 was destroyed during remedial excavation activities. Remedial activities are presented in Clearwater's *Remedial Report of Findings*, dated February 10, 2004. The HCDEH concurred with Clearwater's recommendations in a letter dated March 8, 2004.

On March 18, 2004, Beacom pumped approximately 10,000 gallons of groundwater from a UST installation excavation proximal to MW-1. On March 29 and 30, 2004, Blue Rock discharged approximately 10,000 gallons of groundwater under permit that contained acceptable levels of MTBE into the City of Arcata's sewer system. Remedial activities are presented in Blue Rock's *First Quarter 2004 Groundwater Monitoring Report*, dated April 5, 2004

Field and Laboratory Activities

Groundwater Monitoring Activities
On May 2, 2005, all five wells (MW-2, MW-4, MW-5, MW-6, and MW-7) were monitored.

Prior to sampling, an electronic water level indicator was used to gauge depth to water in each well, accurate to within ±0.01-foot. All wells were checked for the presence of light non-aqueous phase liquid (LNAPL) petroleum prior to purging. No measurable thicknesses of LNAPL were observed on groundwater in any of the wells.

In preparation for sampling, the wells were purged of groundwater until sampling parameters (temperature, pH, and conductivity) stabilized. Dissolved oxygen measurements were collected to monitor the effectiveness of the dissolved-phase hydrocarbon cleanup.

Following recovery of water levels to at least 80% of their static levels in the other wells, groundwater samples were collected from the wells using disposable polyethylene bailers and transferred to laboratory supplied containers. Sample containers were labeled, documented on a chain-of-custody form, and placed on ice in a cooler for transport to the project laboratory.

Purging instruments were cleaned between use by an Alconox® wash followed by double rinse in clean tap water to prevent cross-contamination. Purge and rinseate water was stored on-site in labeled 55-gallon drums pending future removal and disposal.

Groundwater monitoring and well purging information is presented on Gauge Data/Purge Calculations and Purge Data sheets (attached).

Groundwater Sample Analyses
Groundwater samples were analyzed by Kiff Analytical LLC (Kiff), a DHS-certified laboratory, located in Davis, California, for the following analytes:

- TPHg, BTEX, and MTBE by EPA Method 5030/8260B.

Groundwater Monitoring Results

Groundwater Flow Direction and Gradient

Static groundwater in the wells was present beneath the site at depths ranging from approximately 4.10 (MW-2) to 5.59 (MW-4) feet bgs. Gauging data, combined with well elevation data, were used to calculate groundwater elevation, and to generate a groundwater elevation and gradient map. The groundwater flow direction was calculated to be toward the south at a gradient of 0.012 ft/ft (Figure 3). The groundwater gradient and flow direction are consistent with previous measurements.

Groundwater Contaminant Analytical Results

LNAPL:	None
TPHg concentration:	<50 micrograms per liter (µg/L) (MW-4, MW-5, MW-6, MW-7) to <150 µg/L (MW-2)
Benzene concentration:	<0.50 µg/L (MW-4, MW-5, MW-6, MW-7) to <1.5 µg/L (MW-2)
MTBE Concentration:	<0.50 µg/L (MW-4, MW-5, MW-7) to 820 µg/L (MW-2)
Dissolved Oxygen:	0.57 milligrams per liter (mg/L) (MW-2), 0.52 mg/L (MW-4), 0.61 mg/L (MW-6)

Groundwater sample analytical results are shown graphically on Figures 4a, 4b, and 4c, and cumulative groundwater sample analytical results are summarized in Table 1. Well construction information is summarized in Table 2. Copies of the laboratory report and chain-of-custody form are attached.

Remarks

Groundwater sample analytical results have been decreasing since remedial soil excavation activities were performed in January 2004.

Trend Evaluation for Groundwater Contaminant Levels and Distribution

Trend Evaluation of Dissolved-Phase Contaminant Concentrations

In order to evaluate the rate of attenuation and when contaminants of concern will reach NCRWQCB clean-up Goals, concentrations of contaminants at downgradient well MW-2 were plotted against time since the remedial excavation activities. Also, in order to further evaluate potential natural attenuation that has been ongoing since the release, concentrations of contaminants in MW-1 were plotted against time until the well was removed for installation of new USTs in March 2004. Please refer to Charts 1 and 2. These data were fit with trend lines and associated equations in the method shown in Buscheck, O'Reilly, and Nelson 1993:

$$C(t) = C_0 e^{-(kt)}$$

Where,

$C(t)$ is concentration as a function of time (t)
C_0 = is concentration as $t = 0$
k = is the decay rate (t^{-1})

The following table summarizes the results:

Well	TPHg Decay Rate (day^{-1})	Estimated Year Clean-up Goal Met	MTBE Decay Rate (day^{-1})	Estimated Year Clean-up Goal Met
MW-1	NA	Already Met	-0.0023	~2005
MW-2	-0.0047	~2006	-0.0026*	~2010

Notes:
R^2 value for equations are >0.7 unless otherwise noted.
NA = not applicable
* = R^2 value = 0.4. Although the equation producing the decay rate is not considered a "good fit", qualitative inspection of the plot indicates concentrations are decreasing.

Trend Evaluation of Dissolved-Phase Contaminant Distribution

The extent of the dissolved-phase contaminant plume associated with the site was examined over the life of the project. The dissolved-phase plume appears to be stable, as no significant levels of contamination have been detected in downgradient delineation wells (MW-6 and MW-7) since the wells were installed nearly five years ago.

Summary

The dissolved-phase plume is stable and levels are decreasing. The dissolved-phase hydrocarbon concentrations at the site appear to be attenuating at substantial rates, both before and after the remedial excavation of 2,300 tons of impacted soil. The footprint of the plume has been stable for the at least the last five years, and, with the remedial excavation in 2004, it is expected that it will remain stable or begin to contract in the future.

Project Status

- The site is currently being monitored on a quarterly basis per the HCDEH directives. The next quarterly sampling event is scheduled for August 2005. Groundwater samples will be analyzed for TPHg, BTEX, and MTBE by EPA Method 8260B.
- In January 2004, 1,020 pounds of ORC® were placed in the subsurface below the site and the site is currently being monitoring for dissolved oxygen levels and dissolved-phase hydrocarbon cleanup progress.

Project Recommendations

- Based on the attached first-order contaminant decay rates, Blue Rock recommends continuing groundwater monitoring at the site further document declining contaminant trends before contemplating further remedial actions at this time.
- Based on the contaminant decay rate for monitoring well MW-1, Blue Rock does not recommend installing a replacement well for this area of the site.

References

Buscheck, T.E., O'Reilly, K.T., and Nelson, S.N. 1993. *Evaluation of Intrinsic Bioremediation at Field Sites*. Proceedings of the Conference of Petroleum Hydrocarbons and Organic Chemicals in Ground Water, National Groundwater Association/API, Houston, TX. November 10-12.

Certification

This report was prepared under the supervision of a California Professional Geologist at Blue Rock. All statements, conclusions, and recommendations are based upon published results from past consultants, field observations by Blue Rock, and analyses performed by a state-certified laboratory as they relate to the time, location, and depth of points sampled by Blue Rock. Interpretation of data, including spatial distribution and temporal trends, are based on commonly used geologic and scientific principles. It is possible that interpretations, conclusions, and recommendations presented in this report may change, as additional data become available and/or regulations change.

Information and interpretation presented herein are for the sole use of the client and regulating agency. The information and interpretation contained in this document should not be relied upon by a third party.

The service performed by Blue Rock has been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions in the area of the site. No other warranty, expressed or implied, is made.

If you have any questions regarding this project, please contact us at (707) 441-1934.

Sincerely,
Blue Rock Environmental, Inc.

Prepared by:

Scott Ferriman
Project Scientist

Reviewed by:

Brian Gwinn, PG
Principal Geologist

Attachments:

- Table 1: Groundwater Elevations and Analytical Data
- Table 2: Well Construction Details
- Figure 1: Site location Map
- Figure 2: Site Plan
- Figure 3: Groundwater Elevations and Gradient Map – 5/2/05
- Figure 4a: Dissolved-Phase TPHg Distribution Map – 5/2/05
- Figure 4b: Dissolved-Phase Benzene Distribution Map – 5/2/05
- Figure 4c: Dissolved-Phase MTBE Distribution Map – 5/2/05
- First-Order Contaminant Decay Rates
- Blue Rock Gauge/Purge Calculations and Well Purging Data field sheets
- Laboratory Analytical Report and Chain-of-Custody Form for Monitoring Well Samples

Distribution:

Mr. Clyde Harvey, 1785 Fort Douglas Circle, Salt Lake City, UT 84103
Mr. Dennis O'Keefe, Golden Gate Petroleum, 501 Shell Ave, Martinez, CA 94553

Table 1
GROUNDWATER ELEVATIONS
AND ANALYTICAL DATA
Former Cash Oil Arcata
421 J Street
Arcata, California
Blue Rock Project No. NC-003

Well Name	Sample Date	TOC (feet)	DTW (feet)	SPH (feet)	GWE (feet)	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Methanol (µg/L)	Ethanol (µg/L)	DO (mg/L)
Grab Groundwater Samples																		
B-1	5/7/97	---	---	0.00	---	**9,900**	**880**	**52**	**650**	**690**	**100,000**	---	---	---	---	---	---	---
B-2	5/7/97	---	---	0.00	---	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<1	<1	<1	---	---	---
B-6	12/2/99	---	---	0.00	---	**550**	**0.84**	**0.52**	<0.5	<0.5	**190**	<10	<1	<1	**11**	---	---	---
B-7	12/2/99	---	---	0.00	---	<250	<1	<1	<1	<1	**1,200**	<50	<2.5	<2.5	**13**	---	---	---
B-8	12/2/99	---	---	0.00	---	<50	<0.5	<0.5	<0.5	<0.5	**3.3**	<10	<1	<1	<1	---	---	---
B-9	12/2/99	---	---	0.00	---	**2,600**	**39**	<10	<10	<10	**12,000**	**1,200**	<25	<25	**220**	---	---	---
B-10	12/2/99	---	---	0.00	---	**2,600**	<10	<10	<10	<10	**13,000**	**780**	<25	<25	**380**	---	---	---
B-11	8/31/00	---	---	0.00	---	**54**	<0.5	<0.5	<0.5	**1.3**	**340**	<5	<0.5	<0.5	**4.9**	<100	<10	---
Monitoring Well Groundwater Samples																		
MW-1	9/11/00	98.70	6.11	0.00	92.59	<50	<0.3	<0.3	<0.3	<0.6	**28.2**	<500	<0.5	<0.5	<0.5	---	---	---
	10/16/00	98.70	6.11	0.00	92.59	---	---	---	---	---	---	---	---	---	---	---	---	---
	11/16/00	98.70	4.73	0.00	93.97	---	---	---	---	---	---	---	---	---	---	---	---	---
	12/12/00	98.70	4.60	0.00	94.10	<50	<0.3	<0.3	<0.3	<0.6	**87**	<500	<0.5	<0.5	**22**	---	---	---
	1/22/01	98.70	4.99	0.00	93.71	---	---	---	---	---	---	---	---	---	---	---	---	---
	2/16/01	98.70	4.70	0.00	94.00	---	---	---	---	---	---	---	---	---	---	---	---	---
	3/8/01	98.70	4.53	0.00	94.17	**120**	<0.5	<0.5	<0.5	**44**	**42**	<5	<0.5	<0.5	**9**	<50	<5	---
	6/6/01	98.70	5.51	0.00	93.19	<50	<0.5	<0.5	<0.5	<0.5	**37**	**8.7**	<0.5	<0.5	**2.5**	<200	<5	---
	9/4/01	98.70	6.37	0.00	92.33	<50	<0.5	<0.5	<0.5	<0.5	**61**	<5	<0.5	<0.5	**2.3**	---	---	---
	11/16/01	12.81	4.18	0.00	8.63	<50	<0.5	<0.5	<0.5	<0.5	**15**	<5	<0.5	<0.5	**1.8**	<100	<5	---
	2/8/02	12.81	3.98	0.00	8.83	<50	<0.5	<0.5	<0.5	<0.5	**40**	**9.4**	<0.5	<0.5	**3.4**	---	---	---
	5/3/02	12.81	4.53	0.00	8.28	<50	<0.5	<0.5	<0.5	<0.5	**11**	**8.8**	<0.5	<0.5	**1.1**	---	---	---
	8/29/02	16.19	6.26	0.00	9.93	<50	<0.5	<0.5	<0.5	<0.5	**17**	**16**	<0.5	<0.5	**1.4**	---	---	---
	11/14/02	16.19	5.95	0.00	10.24	<50	<0.5	<0.5	<0.5	<0.5	**11**	<5	<0.5	<0.5	**1.2**	---	---	---
	2/11/03	16.19	4.54	0.00	11.65	<50	<0.5	<0.5	<0.5	<0.5	**8.2**	**10**	<0.5	<0.5	**0.9**	---	---	---
	5/7/03	16.19	4.07	0.00	12.12	<50	<0.5	<0.5	<0.5	<0.5	**9.1**	**13**	<0.5	<0.5	**0.76**	---	---	---
	8/4/03	16.19	5.80	0.00	10.39	<50	<0.5	<0.5	<0.5	<0.5	**6.4**	**10**	<0.5	<0.5	**0.81**	---	---	---
	11/3/03	16.19	6.54	0.00	9.65	<50	<0.5	<0.5	<0.5	<0.5	**8.3**	<5	<0.5	<0.5	**0.72**	---	---	---
	3/8/04	16.19	4.04	0.00	12.15	<50	<0.5	<0.5	<0.5	<0.5	**20**	<5	<0.5	<0.5	<0.5	---	---	0.25
	3/18/04	MW-1 was destroyed during new UST system installation activities.																

Table 1
GROUNDWATER ELEVATIONS
AND ANALYTICAL DATA
Former Cash Oil Arcata
421 J Street
Arcata, California
Blue Rock Project No. NC-003

Well Name	Sample Date	TOC (feet)	DTW (feet)	SPH (feet)	GWE (feet)	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Methanol (µg/L)	Ethanol (µg/L)	DO (mg/L)
MW-2	9/11/00	98.10	5.19	0.00	92.91	**1,120**	<0.3	<0.3	<0.3	<0.6	**3,130**	<500	<0.5	<0.5	**40.3**	---	---	---
	10/16/00	98.10	5.21	0.00	92.89	---	---	---	---	---	---	---	---	---	---	---	---	---
	11/16/00	98.10	3.87	0.00	94.23	---	---	---	---	---	---	---	---	---	---	---	---	---
	12/12/00	98.10	4.88	0.00	93.22	**423**	<0.3	<0.3	<0.3	<0.6	**2,020**	<500	<0.5	<0.5	<0.5	---	---	---
	1/22/01	98.10	4.21	0.00	93.89	---	---	---	---	---	---	---	---	---	---	---	---	---
	2/16/01	98.10	4.01	0.00	94.09	---	---	---	---	---	---	---	---	---	---	---	---	---
	3/8/01	98.10	3.92	0.00	94.18	<200	<2	<2	<2	<2	**1,400**	<20	<2	<2	**18**	<500	<20	---
	6/6/01	98.10	4.74	0.00	93.36	<500	<5	<5	<5	<5	**1,200**	<50	<5	<5	**20**	**6,000**	<50	---
	9/4/01	98.10	5.64	0.00	92.46	<50	<0.5	<0.5	<0.5	<0.5	**1,100**	**100**	<0.5	<0.5	**17**	---	---	---
	11/16/01	12.23	3.85	0.00	8.38	<100	<1	<1	<1	<1	**710**	**18**	<1	<1	**12**	<2,000	<10	---
	2/8/02	12.23	3.46	0.00	8.77	**1,300**	**19**	<10	<10	<10	**3,600**	**140**	<10	<10	**100**	---	---	---
	5/3/02	12.23	3.93	0.00	8.30	<1,000	<10	<10	<10	<10	**4,300**	**250**	<10	<10	**150**	---	---	---
	8/29/02	15.61	5.55	0.00	10.06	<1,000	<10	<10	<10	<10	**3,100**	<100	<10	<10	**87**	---	---	---
	11/14/02	15.61	5.24	0.00	10.37	**220**	<1	<1	<1	<1	**2,200**	**16**	<1	<1	**67**	---	---	---
	2/11/03	15.61	3.97	0.00	11.64	<1,000	**11**	<10	<10	<10	**4,400**	**170**	<10	<10	**160**	---	---	---
	5/7/03	15.61	3.53	0.00	12.08	<1,000	<10	<10	<10	<10	**4,200**	**210**	<10	<10	**170**	---	---	---
	8/4/03	15.61	5.05	0.00	10.56	<500	<5	<5	<5	<5	**2,100**	<50	<5	<5	**64**	---	---	---
	11/3/03	15.61	6.02	0.00	9.59	<500	<5	<5	<5	<5	**1,800**	<50	<5	<5	**58**	---	---	---
	3/8/04	15.61	3.87	0.00	11.74	<1,000	<10	<10	<10	<10	**4,200**	**150**	<10	<10	**150**	---	---	0.52
	5/17/04	15.61	4.62	0.00	10.99	<1,000	<10	<10	<10	<20	**940**	<100	<10	<10	**34**	---	---	0.76
	8/2/04	15.61	5.31	0.00	10.30	<200	<2	<2	<2	<2	**1,000**	---	---	---	---	---	---	1.53
	11/1/04	15.61	4.17	0.00	11.44	<200	<1.5	<1.5	<1.5	<1.5	**700**	---	---	---	---	---	---	1.19
	2/3/05	15.61	3.78	0.00	11.83	<200	<1.5	<1.5	<1.5	<1.5	**1,100**	---	---	---	---	---	---	1.90
	5/2/05	15.61	4.10	0.00	11.51	<150	<1.5	<1.5	<1.5	<1.5	**820**	---	---	---	---	---	---	0.57
MW-3	9/11/00	99.58	5.39	0.00	94.19	**6,390**	**186**	**5**	**10.4**	**10.7**	**12,500**	<500	<0.5	<0.5	**1,150**	---	---	---
	10/16/00	99.58	6.36	0.00	93.22	---	---	---	---	---	---	---	---	---	---	---	---	---
	11/16/00	99.58	4.84	0.00	94.74	---	---	---	---	---	---	---	---	---	---	---	---	---
	12/12/00	99.58	4.76	0.00	94.82	**29,200**	**499**	<150	<150	<300	**41,100**	<250,000	<250	<250	**2,280**	---	---	---
	1/22/01	99.58	5.27	0.00	94.31	---	---	---	---	---	---	---	---	---	---	---	---	---
	2/16/01	99.58	4.91	0.00	94.67	---	---	---	---	---	---	---	---	---	---	---	---	---
	3/8/01	99.58	4.79	0.00	94.79	**3,100**	**230**	**130**	**35**	**62**	**6,900**	**2,100**	<10	<10	**290**	<10,000	<200	---
	6/6/01	99.58	5.93	0.00	93.65	<5,000	**190**	<25	<25	<25	**16,000**	**5,000**	<25	<25	**530**	<10,000	<1,000	---
	9/4/01	99.58	6.84	0.00	92.74	**4,700**	**230**	**100**	**25**	**88**	**16,000**	**7,000**	<20	<20	**990**	---	---	---
	11/16/01	13.70	4.55	0.00	9.15	**10,000**	**720**	**590**	**250**	**970**	**22,000**	**4,200**	<50	<50	**1,200**	<120,000	<500	---
	2/8/02	13.70	3.90	0.00	9.80	**4,200**	**170**	**26**	**54**	**75**	**6,000**	**920**	<20	<20	**260**	---	---	---
	5/3/02	13.70	4.62	0.00	9.08	**2,700**	**110**	<20	**26**	**22**	**9,500**	**3,400**	<20	<20	**790**	---	---	---
	8/29/02	17.08	6.74	0.00	10.34	**1,800**	**80**	<10	<10	<10	**4,700**	**1,200**	<10	<10	**540**	---	---	---
	11/14/02	17.08	6.38	0.00	10.70	**4,300**	**120**	<20	<20	<20	**8,600**	**1,800**	<20	<20	**1,400**	---	---	---

Table 1
GROUNDWATER ELEVATIONS
AND ANALYTICAL DATA
Former Cash Oil Arcata
421 J Street
Arcata, California
Blue Rock Project No. NC-003

Well Name	Sample Date	TOC (feet)	DTW (feet)	SPH (feet)	GWE (feet)	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Methanol (µg/L)	Ethanol (µg/L)	DO (mg/L)
MW-3	2/11/03	17.08	4.73	0.00	12.35	**4,500**	**200**	<20	**27**	<20	**11,000**	**2,800**	<20	<20	**760**	---	---	---
	5/7/03	17.08	4.15	0.00	12.93	**2,800**	**120**	<20	**26**	**26**	**5,700**	**1,200**	<20	<20	**430**	---	---	---
	8/4/03	17.08	6.25	0.00	10.83	**1,900**	**79**	<10	<10	<10	**5,500**	**1,500**	<10	<10	**420**	---	---	---
	11/3/03	17.08	6.88	0.00	10.20	**1,900**	**75**	<10	<10	<10	**4,600**	**1,500**	<10	<10	**380**	---	---	---
	1/20/04	Removed during remedial soil excavation activities																
MW-4	9/11/00	100.50	7.07	0.00	93.43	<50	**0.4**	<0.3	<0.3	<0.6	<10	<500	<0.5	<0.5	**3.7**	---	---	---
	10/16/00	100.50	7.97	0.00	92.53	---	---	---	---	---	---	---	---	---	---	---	---	---
	11/16/00	100.50	5.45	0.00	95.05	---	---	---	---	---	---	---	---	---	---	---	---	---
	12/12/00	100.50	6.08	0.00	94.42	<50	<0.3	<0.3	<0.3	<0.6	**2**	<500	<0.5	<0.5	<0.5	---	---	---
	1/22/01	100.50	5.79	0.00	94.71	---	---	---	---	---	---	---	---	---	---	---	---	---
	2/16/01	100.50	5.29	0.00	95.21	---	---	---	---	---	---	---	---	---	---	---	---	---
	3/8/01	100.50	5.22	0.00	95.28	<50	<0.5	<0.5	<0.5	<0.5	**0.94**	<5	<0.5	<0.5	<0.5	<50	<5	---
	6/6/01	100.50	6.52	0.00	93.98	<50	<0.5	<0.5	<0.5	<0.5	**0.57**	<5	<0.5	<0.5	<0.5	<50	<5	---
	9/4/01	100.50	7.56	0.00	92.94	<50	<0.5	<0.5	<0.5	<0.5	**0.78**	<5	<0.5	<0.5	<0.5	---	---	---
	11/16/01	14.59	4.96	0.00	9.63	<50	<0.5	<0.5	<0.5	<0.5	**0.58**	<5	<0.5	<0.5	<0.5	<50	<5	---
	2/8/02	14.59	4.74	0.00	9.85	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	5/3/02	14.59	5.04	0.00	9.55	<50	<0.5	<0.5	<0.5	<0.5	**1.3**	<5	<0.5	<0.5	<0.5	---	---	---
	8/29/02	17.97	7.42	0.00	10.55	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	11/14/02	17.97	7.02	0.00	10.95	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	2/11/03	17.97	5.11	0.00	12.86	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	5/7/03	17.97	4.53	0.00	13.44	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	8/4/03	17.97	6.94	0.00	11.03	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	11/3/03	17.97	7.61	0.00	10.36	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	3/8/04	17.97	5.04	0.00	12.93	<50	<0.5	<0.5	<0.5	<0.5	**3.9**	<5	<0.5	<0.5	<0.5	---	---	0.12
	5/17/04	17.97	6.73	0.00	11.24	<50	<0.5	<0.5	<0.5	<0.5	**5.2**	<5	<0.5	<0.5	<0.5	---	---	0.84
	8/2/04	17.97	6.89	0.00	11.08	<50	<0.5	<0.5	<0.5	<0.5	**43**	---	---	---	---	---	---	1.99
	11/1/04	17.97	5.66	0.00	12.31	<50	<0.5	<0.5	<0.5	<0.5	**2.8**	---	---	---	---	---	---	1.38
	2/3/05	17.97	5.01	0.00	12.96	<50	<0.5	<0.5	<0.5	<0.5	**1.0**	---	---	---	---	---	---	1.92
	5/2/05	17.97	5.59	0.00	12.38	<50	<0.5	<0.5	<0.5	<0.5	<0.5	---	---	---	---	---	---	0.52
MW-5	11/16/01	12.27	5.18	0.00	7.09	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<50	<5	---
	2/8/02	12.27	4.39	0.00	7.88	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	5/3/02	12.27	4.56	0.00	7.71	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	8/29/02	15.64	5.97	0.00	9.67	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	11/14/02	15.64	5.80	0.00	9.84	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	2/11/03	15.64	4.59	0.00	11.05	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	5/7/03	15.64	4.33	0.00	11.31	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	8/4/03	15.64	5.48	0.00	10.16	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---

Table 1
GROUNDWATER ELEVATIONS
AND ANALYTICAL DATA
Former Cash Oil Arcata
421 J Street
Arcata, California
Blue Rock Project No. NC-003

Well Name	Sample Date	TOC (feet)	DTW (feet)	SPH (feet)	GWE (feet)	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Methanol (µg/L)	Ethanol (µg/L)	DO (mg/L)
MW-5	11/3/03	15.64	6.57	0.00	9.07	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	3/8/04	15.64	4.49	0.00	11.15	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	0.38
	5/17/04	15.64	4.98	0.00	10.66	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	0.78
	8/2/04	15.64	5.69	0.00	9.95	<50	<0.5	<0.5	<0.5	<0.5	<0.5	---	---	---	---	---	---	1.89
	11/1/04	15.64	4.86	0.00	10.78	<50	<0.5	<0.5	<0.5	<0.5	<0.5	---	---	---	---	---	---	1.36
	2/3/05	15.64	4.60	0.00	11.04	<50	<0.5	<0.5	<0.5	<0.5	<0.5	---	---	---	---	---	---	2.29
	5/2/05	15.64	4.64	0.00	11.00	<50	<0.5	<0.5	<0.5	<0.5	<0.5	---	---	---	---	---	---	0.67
MW-6	11/16/01	11.41	4.51	0.00	6.90	<50	<0.5	<0.5	<0.5	<0.5	**0.9**	<5	<0.5	<0.5	<0.5	<50	<5	---
	2/8/02	11.41	4.15	0.00	7.26	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	5/3/02	11.41	4.13	0.00	7.28	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	8/29/02	14.78	5.36	0.00	9.42	<50	<0.5	<0.5	<0.5	<0.5	**0.68**	<5	<0.5	<0.5	<0.5	---	---	---
	11/14/02	14.78	5.19	0.00	9.59	<50	<0.5	<0.5	<0.5	<0.5	**1.0**	<5	<0.5	<0.5	<0.5	---	---	---
	2/11/03	14.78	4.16	0.00	10.62	<50	<0.5	<0.5	<0.5	<0.5	**0.8**	<5	<0.5	<0.5	<0.5	---	---	---
	5/7/03	14.78	3.90	0.00	10.88	<50	<0.5	<0.5	<0.5	<0.5	**0.6**	<5	<0.5	<0.5	<0.5	---	---	---
	8/4/03	14.78	4.90	0.00	9.88	<50	<0.5	<0.5	<0.5	<0.5	**0.65**	<5	<0.5	<0.5	<0.5	---	---	---
	11/3/03	14.78	6.11	0.00	8.67	<50	<0.5	<0.5	<0.5	<0.5	**1.5**	<5	<0.5	<0.5	<0.5	---	---	---
	3/8/04	14.78	4.08	0.00	10.70	<50	<0.5	<0.5	<0.5	<0.5	**0.51**	<5	<0.5	<0.5	<0.5	---	---	0.12
	5/17/04	14.78	4.42	0.00	10.36	<50	<0.5	<0.5	<0.5	<0.5	**0.60**	<5	<0.5	<0.5	<0.5	---	---	0.80
	8/2/04	14.78	5.07	0.00	9.71	<50	<0.5	<0.5	<0.5	<0.5	**0.72**	---	---	---	---	---	---	1.73
	11/1/04	14.78	4.32	0.00	10.46	<50	<0.5	<0.5	<0.5	<0.5	**2.3**	---	---	---	---	---	---	1.23
	2/3/05	14.78	4.15	0.00	10.63	<50	<0.5	<0.5	<0.5	<0.5	**0.68**	---	---	---	---	---	---	2.34
	5/2/05	14.78	4.19	0.00	10.59	<50	<0.5	<0.5	<0.5	<0.5	**0.56**	---	---	---	---	---	---	0.61

Table 1
GROUNDWATER ELEVATIONS
AND ANALYTICAL DATA
Former Cash Oil Arcata
421 J Street
Arcata, California
Blue Rock Project No. NC-003

Well Name	Sample Date	TOC (feet)	DTW (feet)	SPH (feet)	GWE (feet)	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Methanol (µg/L)	Ethanol (µg/L)	DO (mg/L)
MW-7	11/16/01	11.91	5.19	0.00	6.72	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<50	<5	---
	2/8/02	11.91	4.67	0.00	7.24	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	5/3/02	11.91	5.06	0.00	6.85	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	8/29/02	15.28	6.20	0.00	9.08	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	11/14/02	15.28	5.83	0.00	9.45	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	2/11/03	15.28	5.12	0.00	10.16	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	5/7/03	15.28	4.75	0.00	10.53	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	8/4/03	15.28	5.77	0.00	9.51	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	11/3/03	15.28	6.84	0.00	8.44	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	---
	3/8/04	15.28	4.96	0.00	10.32	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	0.15
	5/17/04	15.28	5.23	0.00	10.05	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	---	---	0.69
	8/2/04	15.28	6.06	0.00	9.22	<50	<0.5	<0.5	<0.5	<0.5	<0.5	---	---	---	---	---	---	1.64
	11/1/04	15.28	5.26	0.00	10.02	<50	<0.5	<0.5	<0.5	<0.5	<0.5	---	---	---	---	---	---	1.28
	2/3/05	15.28	4.97	0.00	10.31	<50	<0.5	<0.5	<0.5	<0.5	<0.5	---	---	---	---	---	---	2.31
	5/2/05	15.28	5.01	0.00	10.27	<50	<0.5	<0.5	<0.5	<0.5	<0.5	---	---	---	---	---	---	0.58
					MCL	---	1	150	300	1,750	13	---						
					Taste & odor threshold	5	---	42	29	17	---	---						
					NCRWQCB Cleanup Goals	<50	0.5	42	29	17	5	---						

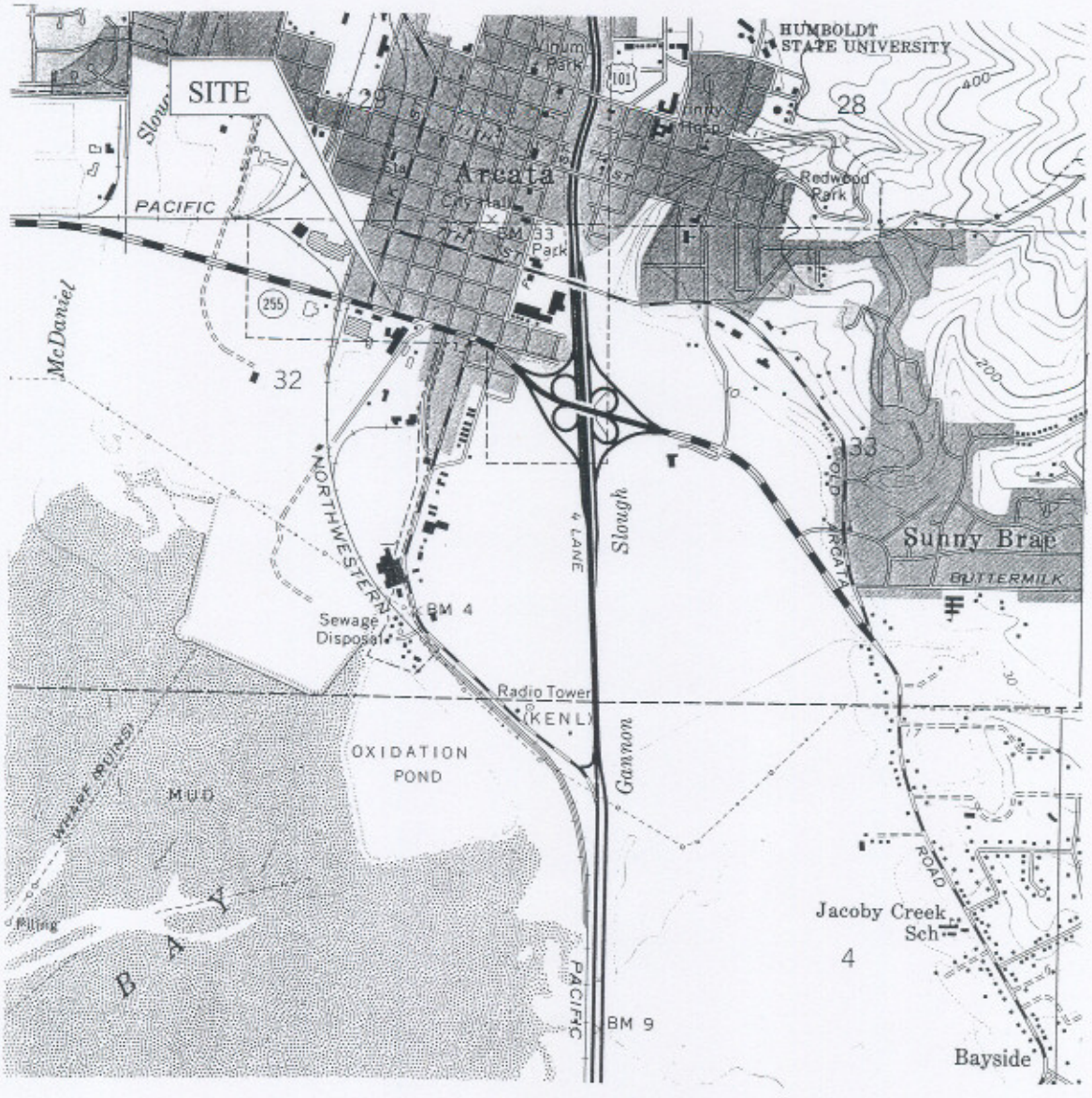
Notes :

TOC: Top of well casing surveyed to established benchmark.
DTW: Depth to water as referenced to top of casing.
SPH: Separate phase hydrocarbon on top of groundwater.
GWE: Groundwater elevation as referenced to benchmark.
µg/L = micrograms per liter = parts per billion = ppb
MCL: maximum contaminant level, a Federal drinking water standard
<###: Not detected in concentrations exceeding the indicated laboratory detection limit
DO: Dissloved oxygen collected using YSI meter (downhole measurement)

TPHg: Total petroleum hydrocarbons as gasoline by Method 5030/8260B
MTBE: Methyl tertiary butyl ether by Method 8260B
TBA: Tertiary butyl alcohol by Method 8260B
DIPE: Di isopropyl ether by Method 8260B
ETBE: Ethyl tertiary butyl ether by Method 8260B
TAME: Tertiary amyl methyl ether by Method 8260B
NCRWQCB: North Coast Region Water Quality Control Board

Table 2
WELL CONSTRUCTION DETAILS
Former Cash Oil Arcata
421 J Street
Arcata, California
Blue Rock Project No. NC-003

Well Identification	Date Intstalled	Intstalled by	Casing Diameter (inches)	Total Depth (feet)	Blank Interval (feet)	Screened Interval (feet)	Slot Size (inches)	Filter Pack (feet)	Bentonite Seal (feet)	Cement (feet)
MW-1	8/31/00	Clearwater	2	20	0-3	3-20	0.02	2.5-20	1.5-2.5	0-1.5
	(MW-1 was destroyed in 3/04 for installation of the new UST system.)									
MW-2	8/31/00	Clearwater	2	20	0-3	3-20	0.02	2.5-20	1.5-2.5	0-1.5
MW-3	8/31/00	Clearwater	2	20	0-3	3-20	0.02	2.5-20	1.5-2.5	0-1.5
	(MW-3 was destroyed in 1/04 for remedial excavation.)									
MW-4	8/31/00	Clearwater	2	20	0-3	3-20	0.02	2.5-20	1.5-2.5	0-1.5
MW-5	11/8/01	Clearwater	2	20	0-3	3-20	0.02	2.5-20	1.5-2.5	0-1.5
MW-6	11/8/01	Clearwater	2	20	0-3	3-20	0.02	2.5-20	1.5-2.5	0-1.5
MW-7	11/8/01	Clearwater	2	20	0-3	3-20	0.02	2.5-20	1.5-2.5	0-1.5



SCALE 1:24 000

1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 KILOMETER

CONTOUR INTERVAL 40 FEET

QUADRANGLE LOCATION

MAP SOURCE: USGS Arcata South Quadrangle

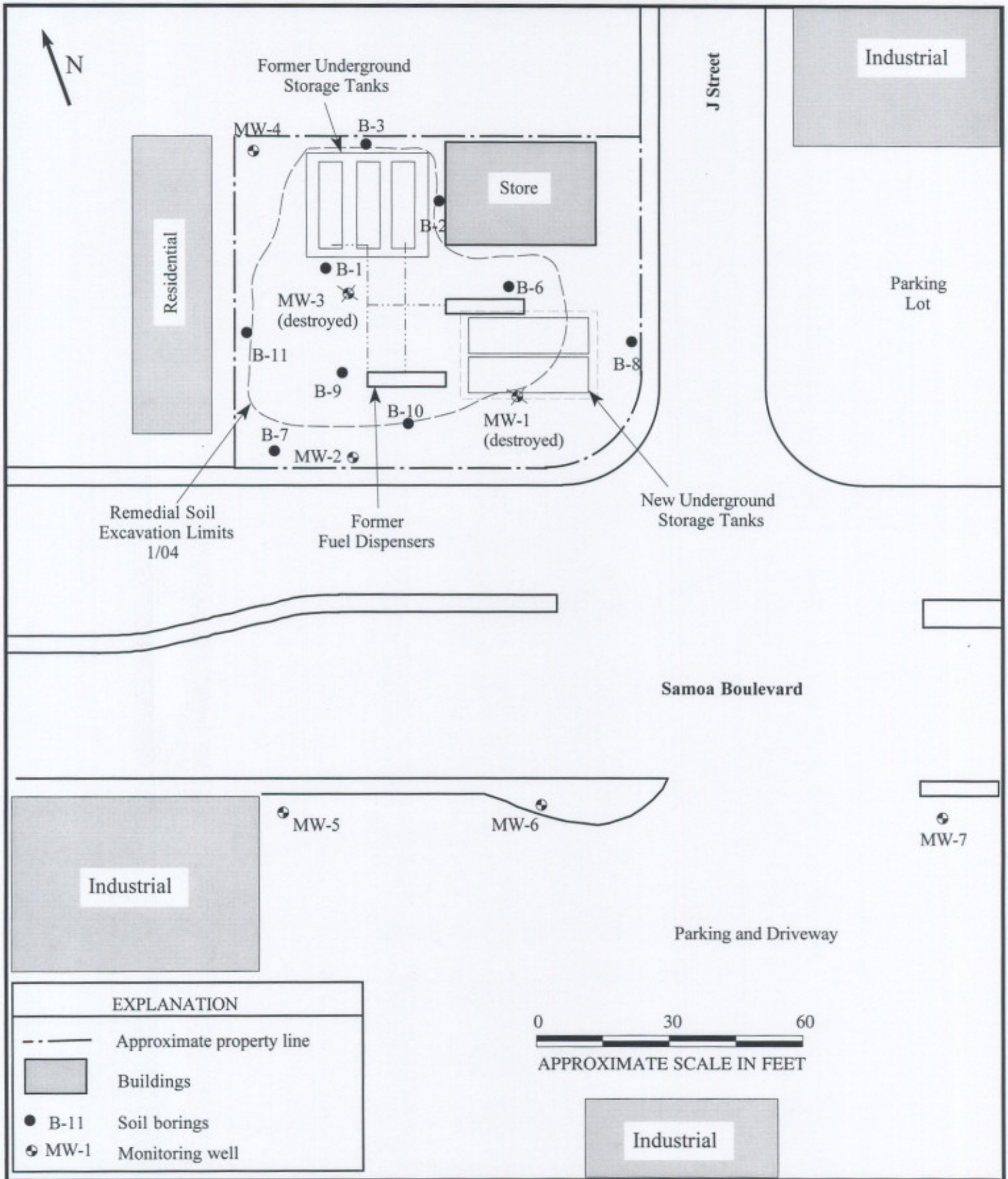
N

Site Location Map

Former Cash Oil Arcata
421 J Street
Arcata, California

BLUE ROCK ENVIRONMENTAL, INC.

Project No.	Date	Figure
NC-003	4/04	1

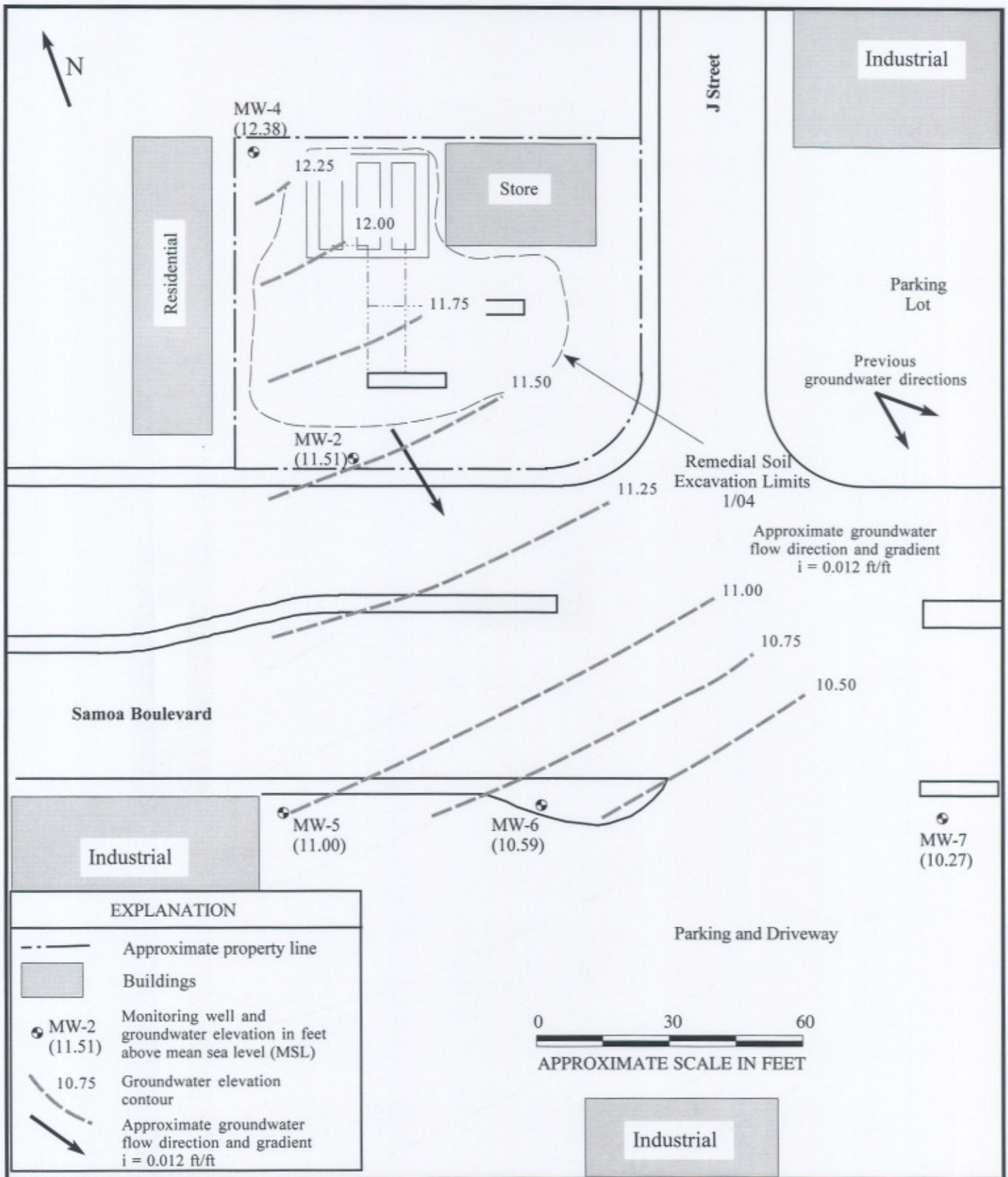


Site Plan

Former Cash Oil Arcata
421 J Street
Arcata, California

BLUE ROCK ENVIRONMENTAL, INC.

Project No.	Report Date	Figure
NC-003	5/05	2

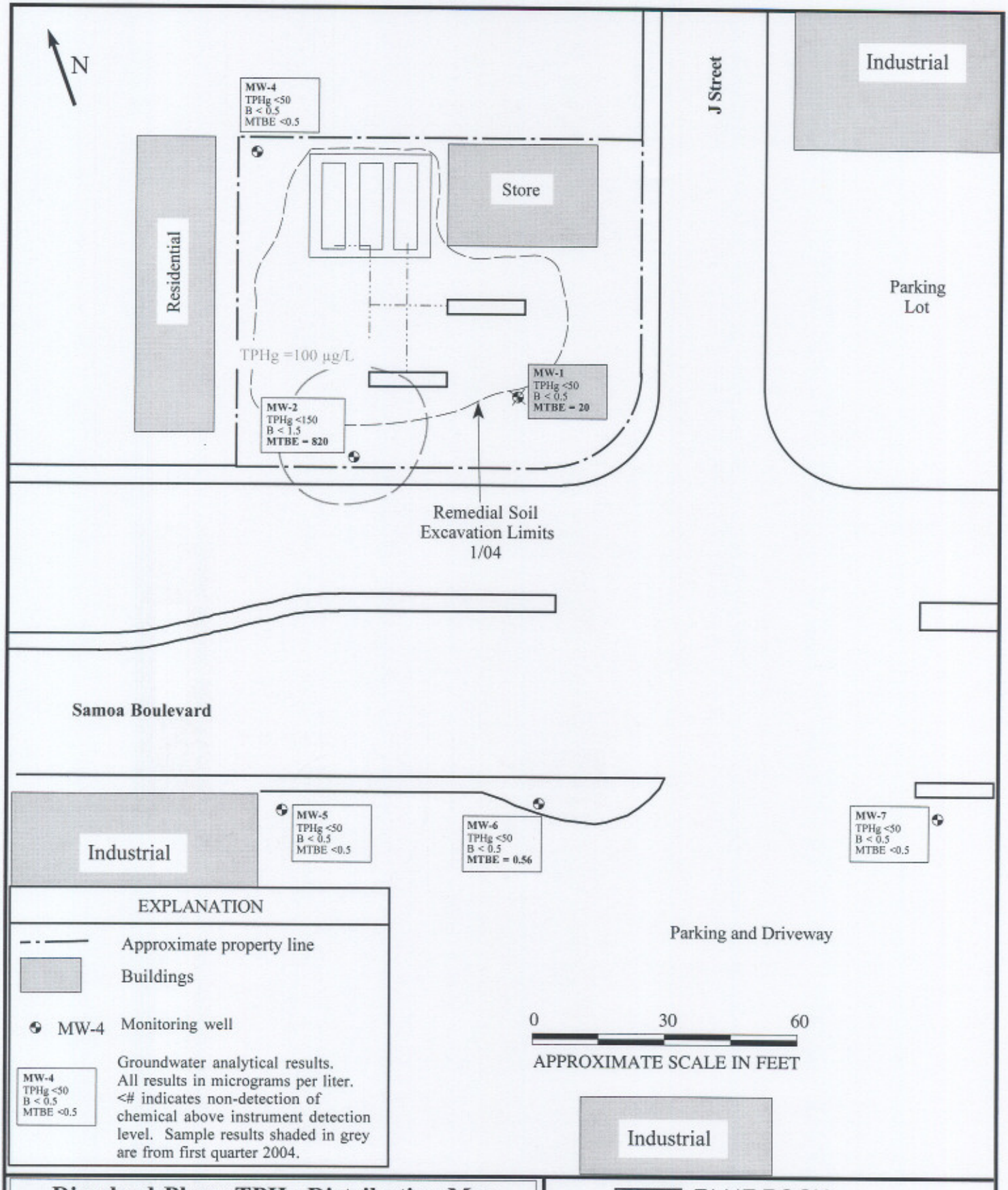


Groundwater Elevations and Gradient Map
5/2/05

Former Cash Oil Arcata
421 J Street
Arcata, California

BLUE ROCK ENVIRONMENTAL, INC.

Project No.	Report Date	Figure
NC-3	5/05	3

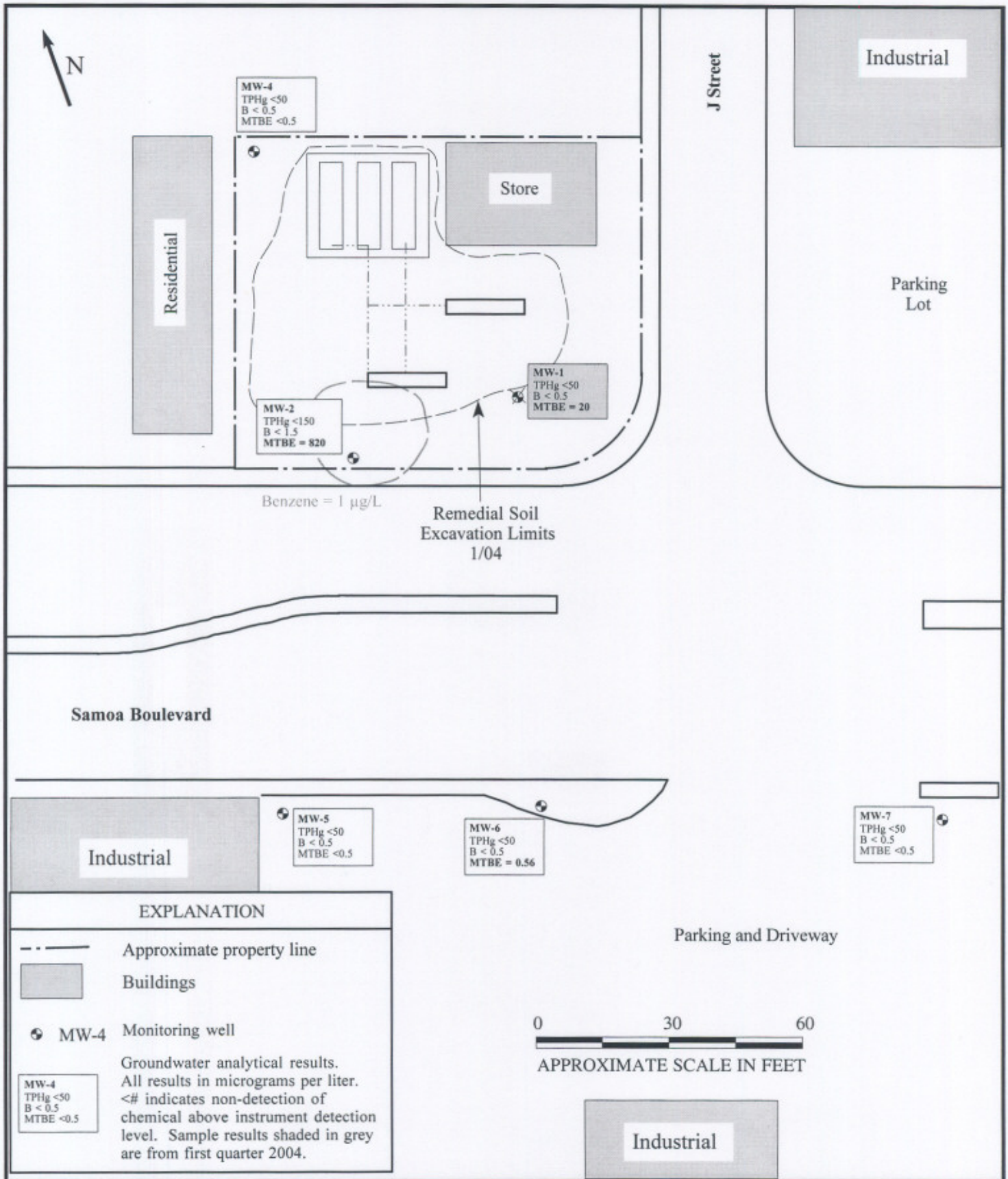


Dissolved-Phase TPHg Distribution Map
5/2/05

Former Cash Oil Arcata
421 J Street
Arcata, California

BLUE ROCK ENVIRONMENTAL, INC.

Project No.	Report Date	Figure
NC-3	5/05	4a

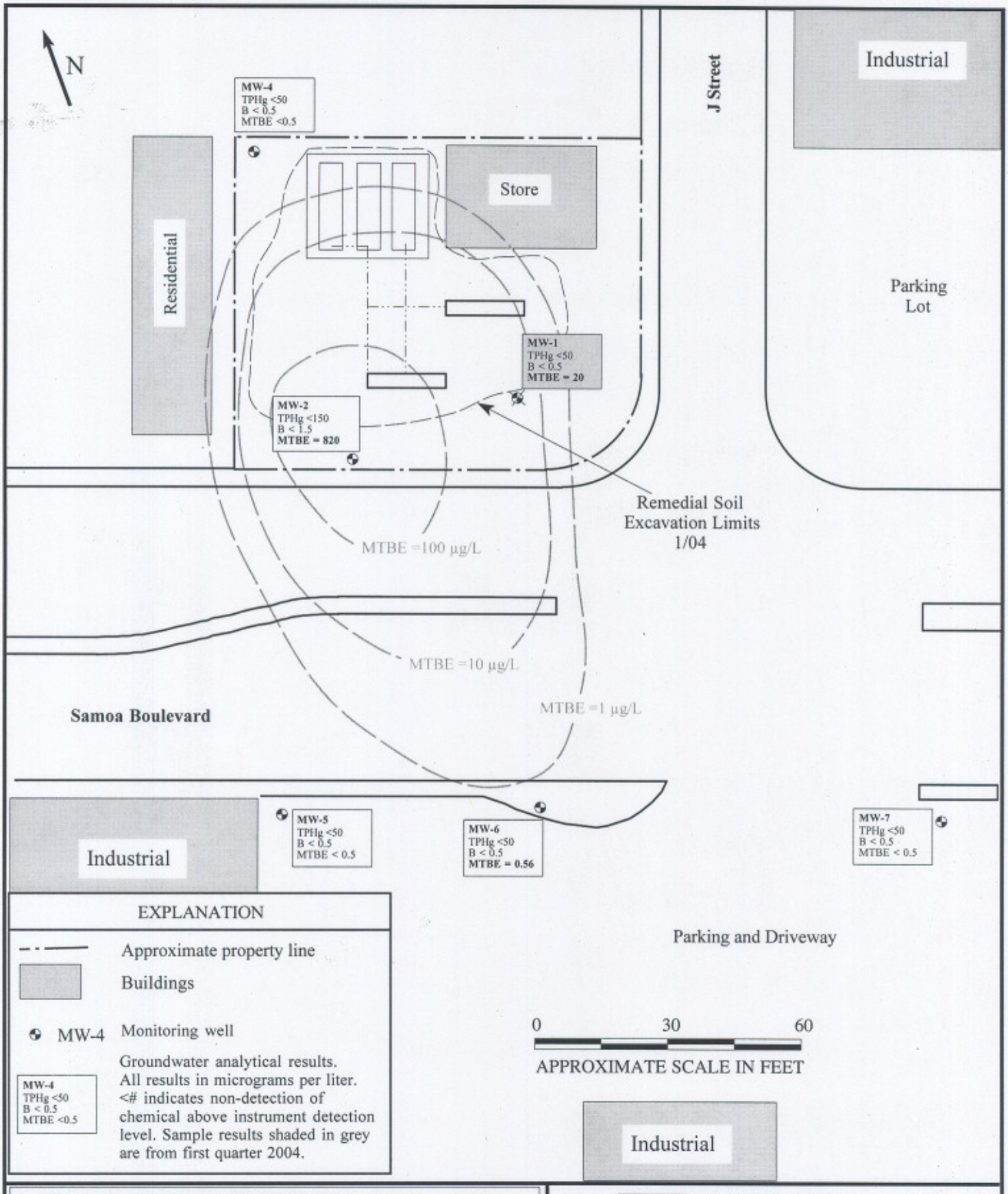


Dissolved-Phase Benzene Distribution Map
5/2/05

Former Cash Oil Arcata
421 J Street
Arcata, California

BLUE ROCK ENVIRONMENTAL, INC.

Project No.	Report Date	Figure
NC-3	5/05	4b



Dissolved-Phase MTBE Distribution Map

5/2/05

Former Cash Oil Arcata
421 J Street
Arcata, California

BLUE ROCK ENVIRONMENTAL, INC.

Project No.	Report Date	Figure
NC-3	5/05	4c

Chart 1
Dissolved-Phase Hydrocarbon Concentrations vs. Time for MW-1
Former Cash Oil Arcata
421 J Street
Arcata, California

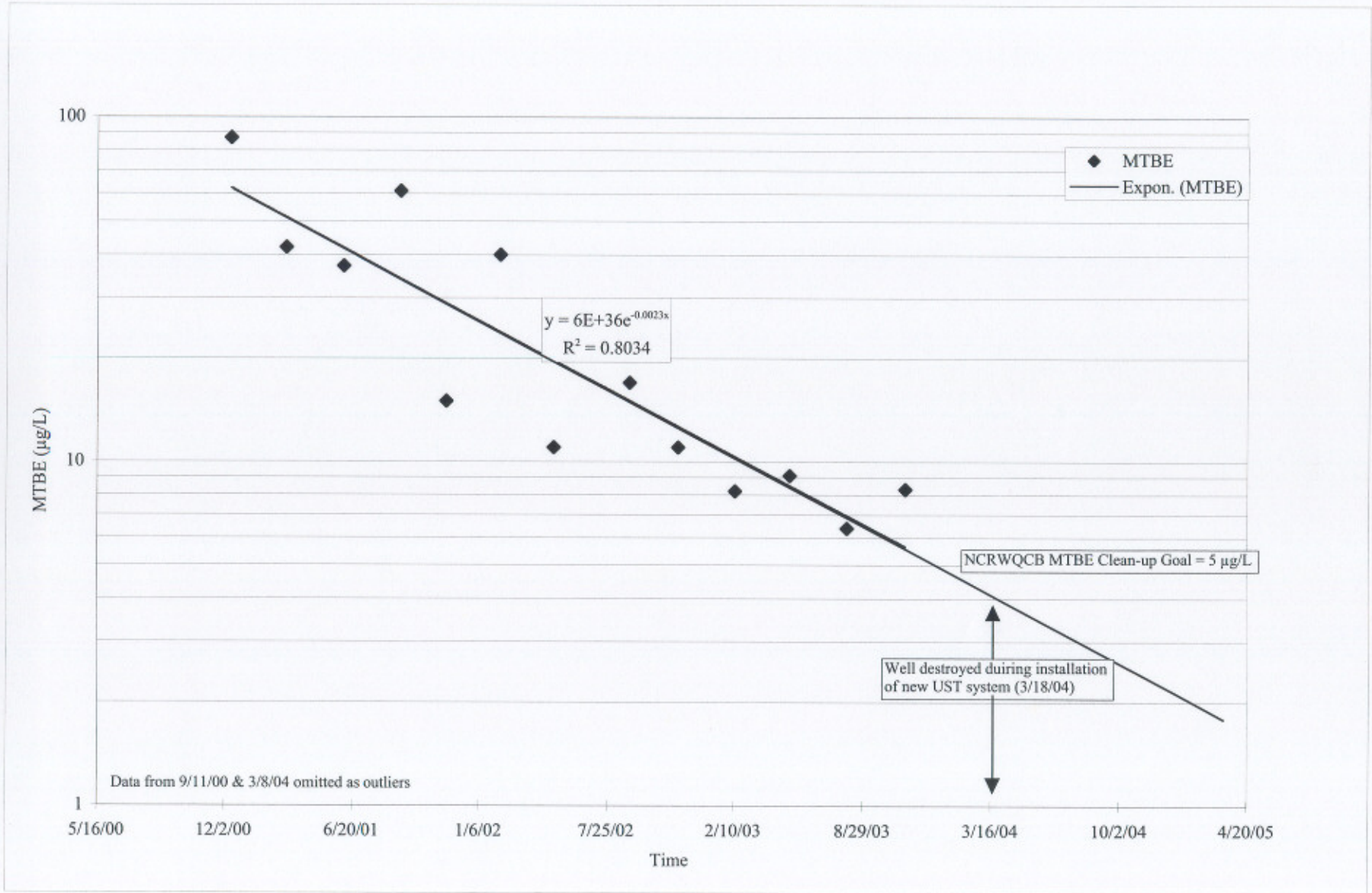
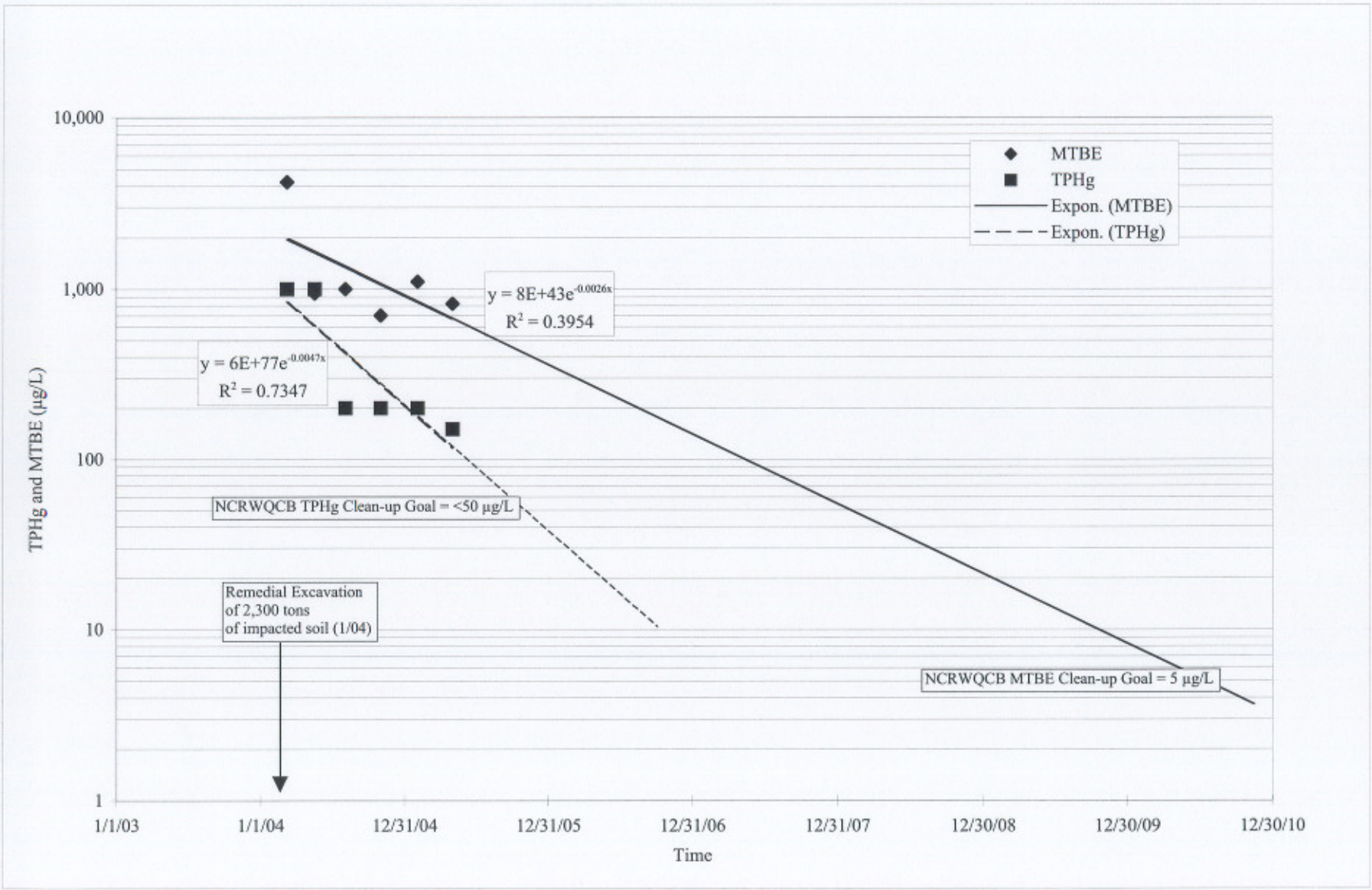


Chart 2
Dissolved-Phase Hydrocarbon Concentrations vs. Time for MW-2
Former Cash Oil Arcata
421 J Street
Arcata, California



GAGING DATA/PURGE CALCULATIONS

Job No.: NC-3 **Location:** 421 J Street Arcata, CA **Date:** 5-2-05 **Tech(s):** J.L.

WELL NO.	DIA. (in.)	DTB (ft.)	DTW (ft.)	ST (ft.)	CV (gal.)	PV (gal.)	SPH (ft.)	NOTES
MW-2	2"	16.11	4.10	12.01	1.92	5.76	0	DO = 0.57
MW-4	↓	15.93	5.59	10.34	1.65	4.95	0	DO = 0.52
MW-5	↓	11.46	4.64	6.82	1.09	3.27	0	DO = 0.67
MW-6	↓	14.38	4.19	10.19	1.63	4.89	0	DO = 0.61
MW-7	↓	15.23	5.01	10.22	1.63	4.89	0	DO = 0.58

Explanation:
DIA. = Well Diameter
DTB = Depth to Bottom
DTW = Depth to Water
ST = Saturated Thickness (DTB-DTW)
CV = Casing Volume (ST x cf)
PV = Purge Volume (standard 3 x CV, well development 10 x CV)
SPH = Thickness of Separate Phase Hydrocarbons

Conversion Factors (cf):
2 in. dia. well cf = 0.16 gal./ft.
4 in. dia. well cf = 0.65 gal./ft.
6 in. dia. well cf = 1.44 gal./ft.

BLUE ROCK ENVIRONMENTAL, INC.

PURGING DATA

SHEET 1 OF 2

Job No.: NC-3 **Location:** 421 J Street Arcata **Date:** 5-2-05 **Tech:** J.L.

WELL No.	TIME	VOLUME (gal.)	COND. (mS/cm)	TEMP. (deg. F.)	pH
MW-2			---	---	---
Calc. purge	12:50	~2			
	12:55	~4			
volume	13:00	~6			
5.76					

COMMENTS: color, turbidity, recharge, sheen

Sample for: (TPHg) TPHd 8260 (BTEX) (MTBE) Metals

Purging Method: (PVC bailer) / Pump

Sampling Method: Dedicated / (Disposable bailer)

Sample at: 13:05

WELL No.	TIME	VOLUME (gal.)	COND. (mS/cm)	TEMP. (deg. F.)	pH
MW-4			---	---	---
Calc. purge	12:50	~1	596	6.70	6.80
	12:55	~3	541	63.1	6.56
volume	13:00	~5	531	62.1	6.50
4.95					

COMMENTS: color, turbidity, recharge, sheen

clear / low turb / mod. rech / no sheen / slight odor

Sample for: (TPHg) TPHd 8260 (BTEX) (MTBE) Metals

Purging Method: (PVC bailer) / Pump

Sampling Method: Dedicated / (Disposable bailer)

Sample at: 13:05

WELL No.	TIME	VOLUME (gal.)	COND. (mS/cm)	TEMP. (deg. F.)	pH
MW-5			---	---	---
Calc. purge	13:48	~1	530	65.4	6.60
	13:53	~2	590	61.6	6.58
volume	13:58	~3	518	60.5	6.63
3.27					

COMMENTS: color, turbidity, recharge, sheen

clear / mod. turb. / mod. rech. / no sheen / no odor

Sample for: (TPHg) TPHd 8260 (BTEX) (MTBE) Metals

Purging Method: (PVC bailer) / Pump

Sampling Method: Dedicated / (Disposable bailer)

Sample at: 14:05

PURGING DATA

Job No.: NC-3 **Location:** 421 5 St. Arcata, CA **Date:** 5-2-05 **Tech:** J.L.

WELL No.	TIME	VOLUME (gal.)	COND. (mS/cm)	TEMP. (deg. F.)	pH
MW-6			---	---	---
Calc. purge	14:15	~1	684	64.1	6.35
volume	14:20	~3	798	62.1	6.37
4.89	14:25	~5	789	61.5	6.41

Sample for: (TPHg) TPHd 8260 (BTEX) (MTBE) Metals

Purging Method: (PVC bailer) / Pump

COMMENTS: color, turbidity, recharge, sheen

clear / mod. turb / good rech / no sheen / no odor

Sampling Method: Dedicated / (Disposable bailer)

Sample at: 14:30

WELL No.	TIME	VOLUME (gal.)	COND. (mS/cm)	TEMP. (deg. F.)	pH
MW-7			---	---	---
Calc. purge	14:50	~1	549	65.7	6.49
volume	14:55	~3	587	63.7	6.37
4.89	15:00	~5	583	62.9	6.42

Sample for: (TPHg) TPHd 8260 (BTEX) (MTBE) Metals

Purging Method: (PVC bailer) / Pump

COMMENTS: color, turbidity, recharge, sheen

clear / low turb / good rech. / no sheen / no odor

Sampling Method: Dedicated / (Disposable bailer)

Sample at: 15:05

WELL No.	TIME	VOLUME (gal.)	COND. (mS/cm)	TEMP. (deg. F.)	pH
MW-2			---	---	---
Calc. purge	13:10	~2	441	68.8	6.59
volume	13:15	~4	526	65.7	6.52
5.76	13:20	~6	520	64.8	6.49

Sample for: (TPHg) TPHd 8260 (BTEX) (MTBE) Metals

Purging Method: (PVC bailer) / Pump

COMMENTS: color, turbidity, recharge, sheen

clear / low turb / mod. rech. / no sheen / no odor

Sampling Method: Dedicated / (Disposable bailer)

Sample at: 13:25

KIFF ANALYTICAL LLC

Report Number : 43553
Date : 5/9/2005

Scott Ferriman
Blue Rock Environmental, Inc.
535 3rd Street, Suite 100
Eureka, CA 95501

Subject : 5 Water Samples
Project Name : Cash Oil Arcata
Project Number : NC-3

Dear Mr. Ferriman,

Chemical analysis of the samples referenced above has been completed. Summaries of the data are contained on the following pages. Sample(s) were received under documented chain-of-custody. US EPA protocols for sample storage and preservation were followed.

Kiff Analytical is certified by the State of California (# 2236). If you have any questions regarding procedures or results, please call me at 530-297-4800.

Sincerely,

Joel Kiff

KIFF ANALYTICAL LLC

Report Number : 43553
Date : 5/9/2005

Project Name : **Cash Oil Arcata**
Project Number : **NC-3**

Sample : **MW-2** Matrix : Water Lab Number : 43553-01
Sample Date :5/2/2005

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**< 1.5**	1.5	ug/L	EPA 8260B	5/5/2005
Toluene	**< 1.5**	1.5	ug/L	EPA 8260B	5/5/2005
Ethylbenzene	**< 1.5**	1.5	ug/L	EPA 8260B	5/5/2005
Total Xylenes	**< 1.5**	1.5	ug/L	EPA 8260B	5/5/2005
Methyl-t-butyl ether (MTBE)	**820**	1.5	ug/L	EPA 8260B	5/5/2005
TPH as Gasoline	**< 150**	150	ug/L	EPA 8260B	5/5/2005
Toluene - d8 (Surr)	97.9		% Recovery	EPA 8260B	5/5/2005
4-Bromofluorobenzene (Surr)	112		% Recovery	EPA 8260B	5/5/2005

Sample : **MW-4** Matrix : Water Lab Number : 43553-02
Sample Date :5/2/2005

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**< 0.50**	0.50	ug/L	EPA 8260B	5/5/2005
Toluene	**< 0.50**	0.50	ug/L	EPA 8260B	5/5/2005
Ethylbenzene	**< 0.50**	0.50	ug/L	EPA 8260B	5/5/2005
Total Xylenes	**< 0.50**	0.50	ug/L	EPA 8260B	5/5/2005
Methyl-t-butyl ether (MTBE)	**< 0.50**	0.50	ug/L	EPA 8260B	5/5/2005
TPH as Gasoline	**< 50**	50	ug/L	EPA 8260B	5/5/2005
Toluene - d8 (Surr)	101		% Recovery	EPA 8260B	5/5/2005
4-Bromofluorobenzene (Surr)	92.5		% Recovery	EPA 8260B	5/5/2005

Approved By: Joel Kiff

2795 2nd St., Suite 300 Davis, CA 95616 530-297-4800

KIFF ANALYTICAL LLC

Report Number : 43553
Date : 5/9/2005

Project Name : **Cash Oil Arcata**
Project Number : **NC-3**

Sample : **MW-5** Matrix : Water Lab Number : 43553-03
Sample Date :5/2/2005

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**< 0.50**	0.50	ug/L	EPA 8260B	5/5/2005
Toluene	**< 0.50**	0.50	ug/L	EPA 8260B	5/5/2005
Ethylbenzene	**< 0.50**	0.50	ug/L	EPA 8260B	5/5/2005
Total Xylenes	**< 0.50**	0.50	ug/L	EPA 8260B	5/5/2005
Methyl-t-butyl ether (MTBE)	**< 0.50**	0.50	ug/L	EPA 8260B	5/5/2005
TPH as Gasoline	**< 50**	50	ug/L	EPA 8260B	5/5/2005
Toluene - d8 (Surr)	100		% Recovery	EPA 8260B	5/5/2005
4-Bromofluorobenzene (Surr)	92.5		% Recovery	EPA 8260B	5/5/2005

Sample : **MW-6** Matrix : Water Lab Number : 43553-04
Sample Date :5/2/2005

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**< 0.50**	0.50	ug/L	EPA 8260B	5/5/2005
Toluene	**< 0.50**	0.50	ug/L	EPA 8260B	5/5/2005
Ethylbenzene	**< 0.50**	0.50	ug/L	EPA 8260B	5/5/2005
Total Xylenes	**< 0.50**	0.50	ug/L	EPA 8260B	5/5/2005
Methyl-t-butyl ether (MTBE)	**0.56**	0.50	ug/L	EPA 8260B	5/5/2005
TPH as Gasoline	**< 50**	50	ug/L	EPA 8260B	5/5/2005
Toluene - d8 (Surr)	101		% Recovery	EPA 8260B	5/5/2005
4-Bromofluorobenzene (Surr)	92.8		% Recovery	EPA 8260B	5/5/2005

Approved By: Joel Kiff

2795 2nd St., Suite 300 Davis, CA 95616 530-297-4800

KIFF ANALYTICAL LLC

Report Number : 43553
Date : 5/9/2005

Project Name : **Cash Oil Arcata**
Project Number : **NC-3**

Sample : **MW-7** Matrix : Water Lab Number : 43553-05
Sample Date :5/2/2005

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	**< 0.50**	0.50	ug/L	EPA 8260B	5/5/2005
Toluene	**< 0.50**	0.50	ug/L	EPA 8260B	5/5/2005
Ethylbenzene	**< 0.50**	0.50	ug/L	EPA 8260B	5/5/2005
Total Xylenes	**< 0.50**	0.50	ug/L	EPA 8260B	5/5/2005
Methyl-t-butyl ether (MTBE)	**< 0.50**	0.50	ug/L	EPA 8260B	5/5/2005
TPH as Gasoline	**< 50**	50	ug/L	EPA 8260B	5/5/2005
Toluene - d8 (Surr)	101		% Recovery	EPA 8260B	5/5/2005
4-Bromofluorobenzene (Surr)	92.0		% Recovery	EPA 8260B	5/5/2005

Approved By: Joel Kiff

2795 2nd St., Suite 300 Davis, CA 95616 530-297-4800

Report Number : 43553

Date : 5/9/2005

QC Report : Method Blank Data

Project Name : **Cash Oil Arcata**

Project Number : **NC-3**

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed
Benzene	< 0.50	0.50	ug/L	EPA 8260B	5/5/2005
Toluene	< 0.50	0.50	ug/L	EPA 8260B	5/5/2005
Ethylbenzene	< 0.50	0.50	ug/L	EPA 8260B	5/5/2005
Total Xylenes	< 0.50	0.50	ug/L	EPA 8260B	5/5/2005
Methyl-t-butyl ether (MTBE)	< 0.50	0.50	ug/L	EPA 8260B	5/5/2005
TPH as Gasoline	< 50	50	ug/L	EPA 8260B	5/5/2005
Toluene - d8 (Surr)	96.9		%	EPA 8260B	5/5/2005
4-Bromofluorobenzene (Surr)	108		%	EPA 8260B	5/5/2005
Benzene	< 0.50	0.50	ug/L	EPA 8260B	5/4/2005
Toluene	< 0.50	0.50	ug/L	EPA 8260B	5/4/2005
Ethylbenzene	< 0.50	0.50	ug/L	EPA 8260B	5/4/2005
Total Xylenes	< 0.50	0.50	ug/L	EPA 8260B	5/4/2005
Methyl-t-butyl ether (MTBE)	< 0.50	0.50	ug/L	EPA 8260B	5/4/2005
TPH as Gasoline	< 50	50	ug/L	EPA 8260B	5/4/2005
Toluene - d8 (Surr)	102		%	EPA 8260B	5/4/2005
4-Bromofluorobenzene (Surr)	91.1		%	EPA 8260B	5/4/2005

Parameter	Measured Value	Method Reporting Limit	Units	Analysis Method	Date Analyzed

Approved By: Joel Kiff

KIFF ANALYTICAL, LLC

2795 2nd St, Suite 300 Davis, CA 95616 530-297-4800

Report Number : 43553

Date : 5/9/2005

QC Report : Matrix Spike/ Matrix Spike Duplicate

Project Name : **Cash Oil Arcata**

Project Number : **NC-3**

Parameter	Spiked Sample	Sample Value	Spike Level	Spike Dup. Level	Spiked Sample Value	Duplicate Spiked Sample Value	Units	Analysis Method	Date Analyzed	Spiked Sample Percent Recov.	Duplicate Spiked Sample Percent Recov.	Relative Percent Diff.	Spiked Sample Percent Recov. Limit	Relative Percent Diff. Limit
Benzene	43547-12	<0.50	40.0	40.0	38.0	37.4	ug/L	EPA 8260B	5/5/05	95.0	93.6	1.47	70-130	25
Toluene	43547-12	<0.50	40.0	40.0	38.1	37.2	ug/L	EPA 8260B	5/5/05	95.2	93.1	2.21	70-130	25
Tert-Butanol	43547-12	<5.0	200	200	195	194	ug/L	EPA 8260B	5/5/05	97.4	97.1	0.229	70-130	25
Methyl-t-Butyl Ether	43547-12	0.75	40.0	40.0	38.6	38.5	ug/L	EPA 8260B	5/5/05	94.6	94.4	0.122	70-130	25
Benzene	43556-01	<0.50	40.0	40.0	41.5	40.6	ug/L	EPA 8260B	5/4/05	104	102	2.03	70-130	25
Toluene	43556-01	<0.50	40.0	40.0	42.1	41.2	ug/L	EPA 8260B	5/4/05	105	103	2.16	70-130	25
Tert-Butanol	43556-01	<5.0	200	200	198	197	ug/L	EPA 8260B	5/4/05	99.2	98.6	0.609	70-130	25
Methyl-t-Butyl Ether	43556-01	<0.50	40.0	40.0	38.9	38.8	ug/L	EPA 8260B	5/4/05	97.2	96.9	0.366	70-130	25

Approved By: Joel Kiff

KIFF ANALYTICAL, LLC

2795 2nd St, Suite 300 Davis, CA 95616 530-297-4800

Report Number : 43553

QC Report : Laboratory Control Sample (LCS)

Date : 5/9/2005

Project Name : **Cash Oil Arcata**

Project Number : **NC-3**

Parameter	Spike Level	Units	Analysis Method	Date Analyzed	LCS Percent Recov.	LCS Percent Recov. Limit
Benzene	40.0	ug/L	EPA 8260B	5/5/05	94.0	70-130
Toluene	40.0	ug/L	EPA 8260B	5/5/05	95.1	70-130
Tert-Butanol	200	ug/L	EPA 8260B	5/5/05	99.6	70-130
Methyl-t-Butyl Ether	40.0	ug/L	EPA 8260B	5/5/05	97.2	70-130
Benzene	40.0	ug/L	EPA 8260B	5/4/05	102	70-130
Toluene	40.0	ug/L	EPA 8260B	5/4/05	106	70-130
Tert-Butanol	200	ug/L	EPA 8260B	5/4/05	98.7	70-130
Methyl-t-Butyl Ether	40.0	ug/L	EPA 8260B	5/4/05	97.7	70-130

Approved By: Joel Kiff

KIFF ANALYTICAL, LLC

2795 2nd St, Suite 300 Davis, CA 95616 530-297-4800

KIFF ANALYTICAL LLC

2795 2nd Street, Suite 300
Davis, CA 95616
Lab: 530.297.4800
Fax: 530.297.4808

Lab No. 43553 Page 1 of 1

Chain-of-Custody Record and Analysis Request

Project Contact (Hardcopy or PDF To): Scott Ferriman

Company/Address: Blue Rock Env. Inc., 535 3rd St. Ste. 100 Eureka, CA

Phone No.: (707) 441-1934 FAX No.: (707) 441-1949

Project Number: NC-3 P.O. No:

Project Name: Cash Oil Arcata

Project Address: 421 J Street Arcata, CA

California EDF Report? ☒ Yes ☐ No

Recommended but not mandatory to complete this section:
Sampling Company Log Code: - - -

Global ID: T0602300231

EDF Deliverable To (Email Address): scott@bluerockenv.com

Sampler Signature: Damer Linderman

TAT: 12 hr/24 hr/48 hr/72 hr/(1 wk)

Sample Designation	Sampling Date	Sampling Time	Container: 40 ml VOA	Container: SLEEVE	Preservative: HCl	Preservative: HNO_3	Preservative: ICE	Preservative: NONE	Matrix: WATER	Matrix: SOIL	BTEX (8021B)	BTEX/TPH Gas/MTBE (8021B/M8015)	TPH as Diesel (M8015)	TPH as Motor Oil (M8015)	TPH Gas/BTEX/MTBE (8260B)	5 Oxygenates/TPH Gas/BTEX (8260B)	7 Oxygenates/TPH Gas/BTEX (8260B)	5 Oxygenates (8260B)	7 Oxygenates (8260B)	Lead Scav. (1,2 DCA & 1,2 EDB - 8260B)	EPA 8260B (Full List)	Volatile Halocarbons (EPA 8260B)	Lead (7421/239.2) TOTAL (X) W.E.T. (X)	TAT	For Lab Use Only
MW-2	5/2/05	13:25	4		X		X		X						X									X	01
MW-4	↓	13:05	↓		↓		↓		↓						↓									↓	02
MW-5	↓	14:05	↓		↓		↓		↓						↓									↓	03
MW-6	↓	14:30	↓		↓		↓		↓						↓									↓	04
MW-7	↓	15:05	↓		↓		↓		↓						↓									↓	05

Relinquished by:	Date	Time	Received by:
Damer Linderman	5/3/05		Fed Ex
	050405	1025	Received by Laboratory: Michelle Spencer Kiff Analytical

Remarks: The samples arrived on wet ice via FedEx at 1020. The temperature of ~~samples~~ MAS the samples in the ice chest was 1.3°C using thermometer IR-1. MAS 050405 1025

Bill to:

Distribution: White - Lab, Pink - Originator

Forms/coc 121001.fh9